

## **SECTION 08711**

### **DOOR HARDWARE**

#### **PART 1 - GENERAL**

##### **0.1 DESCRIPTION OF WORK**

- A.** Work Included: This Section specifies the following items.
1. Commercial door hardware.
  2. Cylinders for doors specified in other Sections as listed below.
  3. Electrified door hardware.
- B.** Items To Be Furnished Only: Furnish the following items for installation by the designated Sections:
1. Section 08331 - OVERHEAD COILING DOORS:
    - a. Lock cylinders.
  2. Section 08334 - OVERHEAD COILING GRILLES:
    - a. Lock cylinders.
  3. Section 10605 - WIRE MESH PARTITIONS:
    - a. Lock cylinders.
- C.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 08111 - STEEL DOORS AND FRAMES; astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
  2. Section 08331 - OVERHEAD COILING DOORS; overhead coiling door hardware, except cylinders.
  3. Section 08334 - OVERHEAD COILING GRILLES; for overhead coiling grille hardware, except cylinders.
  4. Division 16 - ELECTRICAL; power for electrified door hardware and interface with building control and security systems.

##### **0.2 SUBMITTALS**

- A.** Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B.** Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. System schematic.
    - b. Point-to-point wiring diagram.
    - c. Riser diagram.
    - d. Elevation of each door.
  2. Detail interface between electrified door hardware and fire alarm access control and building control and security systems.
- C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
    - a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
      - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door

Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

- D.** Keying Schedule: Prepared by or under the supervision of supplier, detailing the Engineer's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- E.** Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.
  - 1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.
- F.** Qualification Data: For firms and persons specified in Part 1 "Quality Assurance" Article.
  - 1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.
- G.** Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.
- H.** Warranties: Special warranties specified in this Section.

### **0.3 QUALITY ASSURANCE**

- A.** Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B.** Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor and Engineer about door hardware and keying.
  - 1. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
    - a. Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and

engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

2. Scheduling Responsibility: Preparation of door hardware and keying schedules.

**C.** Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

1. Electrified Door Hardware Qualifications: Experienced in providing consulting services for electrified door hardware installations.

**D.** Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.

**E.** Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Massachusetts Architectural Access Board and the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," as follows:
  - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
  - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
    - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
    - 2) Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
    - 3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
  - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
2. NFPA 101: Comply with the following for means of egress doors:
  - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.

- b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf for not more than 3 seconds.
  - c. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
  - d. Thresholds: Not more than 1/2 inch high.
- 3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- F. Fire-Rated Door Assemblies:** Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
  - 1. Test Pressure: Test at atmospheric pressure.
- G. Keying Conference:** Conduct conference at Project site to comply with requirements in Division 1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
  - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  - 2. Preliminary key system schematic diagram.
  - 3. Requirements for key control system.
  - 4. Address for delivery of keys.
- H. Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 1. Review methods and procedures related to electrified door hardware including, but not limited to, the following:
  - 1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
  - 2. Review sequence of operation for each type of electrified door hardware.
  - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review required testing, inspecting, and certifying procedures.

#### **0.4 DELIVERY, STORAGE, AND HANDLING**

- A.** Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

- B.** Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C.** Deliver keys to manufacturer of key control system.

## **0.5 COORDINATION**

- A.** Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Section 03300 - CAST-IN-PLACE CONCRETE.
- B.** Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C.** Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control and building control system.

## **0.6 WARRANTY**

- A.** General Warranty: Special warranties specified in this Article shall not deprive the Authority of other rights the Authority may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B.** Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of operators and door hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C.** Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
- D.** Warranty Period for Manual Closers: Ten years from date of Substantial Completion.

## **0.7 MAINTENANCE SERVICE**

- A.** Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for the Authority's continued adjustment, maintenance, and removal and replacement of door hardware.

## **PART 2 - PRODUCTS**

### **0.1 SCHEDULED DOOR HARDWARE**

- A.** Scheduled and acceptable manufacturers must provide all the functions and features of the specified product or it will not be approved.

| Item                          | Scheduled Manufacturer | Acceptable Manufacturers |
|-------------------------------|------------------------|--------------------------|
| Hinges                        | Ives (IVE)             | McKinney, Hager          |
| Continuous Hinges             | Markar (MAR)           | Stanley, McKinney        |
| Locksets & Deadlocks          | Schlage (SCH)          | Sargent, Best            |
| Keypad Locks                  | Schlage (SCH)          | Campus Standard          |
| Cylinders & Keying            | Schlage (SCH)          | Campus Standard          |
| Exit Devices & Mullions       | Von Duprin (VON)       | Precision, Sargent       |
| Door Closers & Auto Operators | LCN (LCN)              | Norton, Sargent          |
| Push & Pull Plates & Bars     | Ives (IVE)             | Rockwood, Burns          |
| Flush Bolts & Coordinators    | Ives (IVE)             | Rockwood, Burns          |
| Protection Plates             | Ives (IVE)             | Rockwood, Burns          |
| Stops & Holders               | Ives (IVE)             | Rockwood, Burns          |
| Overhead Stops                | Glynn-Johnson (GLY)    | Sargent, Rixson          |
| Silencers                     | Ives (IVE)             | Rockwood, Burns          |
| Thresholds & Weatherstrip     | National Guard (NGP)   | Pemko, Reese             |

- B.** Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- C.** Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Engineer's approval.

## **0.2 MATERIALS**

### **A. Fasteners**

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish non-corrosive screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely.
4. All hardware shall be installed with the fasteners provided by the hardware manufacturer.

### **B. Hinges**

1. The following is a guide for hinge type required for this specification:
  - a. 1 3/4" thick doors up to and including 3'-0" wide:  
exterior: standard weight, ball bearing, bronze/stainless steel, 4 1/2" high  
interior: standard weight, ball bearing, steel, 4 1/2" high
  - b. 1 3/4" thick doors over 3'-0" wide:  
exterior: heavy weight, ball bearing, bronze/stainless steel, 5" high  
interior: heavy weight, ball bearing, steel, 5" high
2. Provide 3 hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.
3. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - a. Steel Hinges: Steel pins
  - b. Non-Ferrous Hinges: Stainless steel pins
  - c. Out-Swinging Exterior Doors: Non-removable pins
  - d. Interior Doors: Non-rising pins
4. The width of hinges shall be 4 1/2" or as required for clearance.

### **C. Continuous Hinges**

1. Provide continuous hinges fabricated from anodized aluminum or stainless steel as scheduled.
2. Provide bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
3. Hinges shall be capable of supporting door weights up to 600 pounds, and shall be successfully tested for 1,500,000 cycles.
4. Install hinges with fasteners supplied by manufacturer. Hole pattern shall be symmetrically patterned.



#### **D. Flush Bolts**

1. Automatic and manual flush bolts shall have forged bronze faceplates with extruded brass levers and with wrought brass guides and strikes. Doors up to 7'-6" in height shall have 12" steel or brass rods. Manual flush bolts for doors over 7'-6" in height shall be increased by 6" for each additional 6" of door height. Provide dust-proof strikes where scheduled.

#### **E. Coordinators**

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide a bar-type coordinating device, surface applied to the underside of the stop at the frame head.
2. Finish of the coordinator to be prime coat to receive the same finish paint as the door frame.
3. Provide a filler bar of the correct length for the unit to span the entire width of the opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes. Factory-prep coordinators for vertical rod devices if required.

#### **F. Mortise Locks**

1. Mortise locks shall be certified as ANSI A156.13, Grade 1 Operational, Grade 1 Security, and shall be manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Lock case shall be multi-function and field reversible for handing without opening the case.
2. Locks are to have a standard 2 3/4" backset with a full 3/4" throw 2-piece stainless steel mechanical anti-friction latchbolt. Deadbolt shall be a full 1" throw, constructed of stainless steel.
3. Lever trim shall be solid brass, bronze, or stainless steel, cast or forged in the design specified, with wrought roses and external lever spring cages. Levers shall be thru-bolted to assure proper alignment, and shall have a 2-piece spindle. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning. Lever design shall be Schlage 17A or similar.
4. Locks meeting this specification: Schlage L9000 series, Sargent 8200 series, Best 35H series.

#### **G. Keypad Locks**

1. Locksets shall be mortise type with 3-piece, beveled, stainless steel latchbolts with 3/4" throw and equipped with an anti-friction latch.
2. Chassis shall accommodate ANSI standard mortise lock prep with a 2 3/4" nominal backset for 1 3/4" doors.
3. Locksets shall be provided from the factory with appropriate handing.

4. Levers shall operate independently of each other. Lock shall use patented clutch mechanism to deter vandalism and maximize durability. Disablement of secured levers shall not permit latchbolt retraction from secure side, but shall allow egress. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous, or where noted on the door schedule, shall be knurled to provide a tactile warning. Lever style to be Schlage 17.
5. Provide key cylinder for emergency key override, with Everest/Primus core.
6. Electrical operation shall be battery operated, capable of 80,000 operating cycles using four AA alkaline batteries. Lock shall be resistant to radio frequency and electrostatic discharge.
7. Outside escutcheon shall have keypad and iButton reader.
8. Visual red and green LED indicators shall indicate activation, operational systems status, system error conditions and low power conditions.
9. Locks meeting this specification: Schlage/Locknetics CM5596.

#### **H. Exit Devices**

1. Exit devices shall be touchpad type, fabricated of brass, bronze, stainless steel, or aluminum, plated to the standard architectural finishes to match the balance of the door hardware.
2. All exit devices shall incorporate a fluid damper or other device which eliminates noise associated with exit device operation. Touchpad shall extend a minimum of one half of the door width. End-cap will have two-point attachment to door. Touch-pad shall match exit device finish, and shall be stainless steel for US26, US26D, US28, US32, and US32D finishes. Only compression springs will be used in devices, latches, and outside trims or controls.
3. All devices to incorporate a security deadlatching feature.
4. Provide roller strikes for all rim and surface mounted vertical rod devices, ASA strikes for mortise devices, and manufacturer's standard strikes for concealed vertical rod devices.
5. Mechanism case shall sit flush on the face of all flush doors, or spacers shall be furnished to fill gaps behind devices. Where glass trim or molding projects off the face of the door, provide glass bead kits.
6. All non-fire-rated exit devices shall have cylinder dogging.
7. Where lever handles are specified as outside trim for exit devices, provide heavy duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to a 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set. Lever style will match the lever style of the locksets.
8. Exit devices shall be UL listed panic exit hardware. All exit devices for fire rated openings shall be UL labeled fire exit hardware.
9. Provide electrical options as scheduled.
10. Exit devices meeting this specification: Von Duprin 98 series, Precision D-1100/D-1200 series, Sargent 80 series with deadlatching.

**I. Door Closers**

1. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron or cast aluminum cylinder. Cylinder body shall be 1 1/2" in diameter, and double heat-treated pinion shall be 11/16" in diameter.
2. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C "positive pressure" fire test.
3. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
4. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers).
5. Closers shall not incorporate a pressure relief valve.
6. All closers shall have metal covers.
7. Closer cylinders, arms, and metal covers shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing by an independent testing laboratory used by BHMA for ANSI certification. For metal components that can't be powder coated, a special rust inhibiting finish (SRI) must be used.
8. Door closers meeting this specification: LCN 4010/4110 series, Norton 7500/PR7560 (standard screws).

**J. Push Plates:** 8" wide x 16" high x .050" thick. Where door stile does not allow 8" wide plates, 4" wide plates may be used.

**K. Door Pulls & Push Bars:** Solid bar stock, diameter and length as scheduled. Push bars shall be of sufficient length to span from center to center of each stile.

**L. Protection Plates:** Provide kick plates as scheduled, with 4 beveled edges. Furnish with machine or wood screws, finished to match plates. Plates shall be 8" high x 2" LWOD on single doors, 1" LWOD on pairs of doors.

**M. Door Stops and Holders**

1. It shall be the responsibility of the hardware supplier to provide door stops for all doors in accordance with the following requirements:
  - a. Wall stops shall be used wherever possible.
  - b. Where wall stops cannot be used, provide dome type floor stops of the proper height.
  - c. At any opening where a wall or floor stop cannot be used, a heavy duty overhead stop must be used.

**N. Thresholds and Weatherstrip:** Furnish as scheduled and per architectural details. Match finish of other items as closely as possible. Provide only

those units where resilient or flexible seal strip is easily replaceable and readily available.

- O.** Silencers: "Push-in" type silencers for each hollow metal or wood frame, 3 for each single frame, 2 for each pair frame. Omit where gasketing is scheduled.

**P.** Automatic Operators:

1. Where low kinetic energy, as defined by ANSI Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide pneumatically powered operators complying with the 1990 ADA guidelines for opening force and time to close standards.
2. Full closing force shall be provided when the power operation cycle ends.
3. Locate power unit and exhaust away from door to minimize noise and vibration in pedestrian areas.
4. All power operator systems shall include the following features and functions:
  - a. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electric Code, section 725-31.
  - b. When an obstruction or resistance to the opening swing is encountered, the operator will continue attempting to open the door. If the obstruction or resistance remains, the operator will again pause the door.
  - c. The operator will be designed to prevent damage to the mechanism if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
5. All covers, mounting plates, and arm systems shall be powder coated and successfully pass a minimum of 100 hours of salt-spray testing as outlined in ANSI Standard A156.18.
6. All operators shall be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.
7. Provisions in the control box or module shall provide control (inputs and outputs) for; electric strike delay, auxiliary contacts, sequential operation, fire alarm systems, actuators, swing side sensors, and stop side sensors.
8. Automatic operators meeting this specification: LCN 2600 Series.

### **0.3 FINISHES**

- A.** With the exception of all items listed below, the finish of all hardware shall be US26D - satin chrome or US32D - satin stainless steel.
- B.** Exceptions are as follows:
  1. Door Closers - aluminum powder coat finish.
  2. Coordinators - prime painted.
  3. Thresholds - mill finish aluminum.

4. Weatherstrip & Sweeps - clear anodized aluminum.
5. Silencers - grey.

#### **0.4 KEYING**

- A.** All locks and cylinders shall be construction master keyed and master keyed per the Authority's instructions, to existing key system.
- B.** All locks and cylinders, except cylinders for keypad locks will be interchangeable core type.
- C.** Provide 3 keys per lock, 6 construction master keys, and a total of 6 master keys for each group.
- D.** All master keys shall be delivered directly to the Authority by the hardware supplier, who shall obtain a receipt for delivery of same.

### **PART 3 - EXECUTION**

#### **0.1 EXAMINATION**

- A.** Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B.** Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C.** Proceed with installation only after unsatisfactory conditions have been corrected.

#### **0.2 PREPARATION**

- A.** Steel Doors and Frames: Comply with DHI A115 series.
  1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.
- B.** Wood Doors: Comply with DHI A115-W series.

#### **0.3 INSTALLATION**

- A.** Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
- B.** Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C.** Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.
- D.** Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Engineer.
1. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.
- E.** Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Section 07920 - JOINT SEALANTS.

#### **0.4 ADJUSTING**

- A.** Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
  2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
  3. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

- B.** Six-Month Adjustment: Six months after date of Substantial Completion, Installer shall perform the following:
1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
  2. Consult with and instruct the Authority's personnel on recommended maintenance procedures.
  3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

## **0.5 CLEANING AND PROTECTION**

- A.** Clean adjacent surfaces soiled by door hardware installation.
- B.** Clean operating items as necessary to restore proper function and finish.
- C.** Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

## **PART 4 - MEASUREMENT AND PAYMENT**

### **0.1 MEASUREMENT AND PAYMENT**

- A.** No separate measurement or payment will be made for work required under this Section. All costs in connection therewith shall be considered incidental to the item or items of work to which they pertain.

### **END OF SECTION**